18970

Postel

Request for Comments #567
NIC #18970

RECEIVED
SEP 28 1973

L. Peter Deutsch
PARC-MAXC
6 September 1973

CROSS-COUNTRY NETWORK BANDWIDTH

The following computation of cross-country network bandwidth was contributed by Butler Lampson of PARC.

Consider what happens when a TIP user on the West Coast, connected to a full-duplex Host on the East Coast, strikes a key on his terminal.

The TIP sends a one-character message (1 packet).

The destination IMP sends a RFNM (1 packet).

The destination Host sends an ALLocate - this seems to be the strategy used by TENEX Hosts, at least (1 packet).

The TIP sends a RFNM for the ALLocate (1 packet).

The same sequence repeats itself, with roles interchanged, for the echo character (4 packets).

This constitutes 4 packets or 4000 bits in each direction. The current cross-country transmission capability of the ARPANET is 3 50Kb phone lines; ergo, it can only support 3*50000/4000=37.5 such characters per second!

It may be that RFNMs are transmitted between IMPs more efficiently; at best this can only double the network capacity.

This computation may help explain why cross-country TIP users (e.g. the substantial West Coast community of BBN-TENEX users) experience such bad echo response, at least in bursts: the network itself may be experiencing momentary peak loads.

If this argument is correct, the proposed remote echoing facilities of the new TELNET protocol could have a major effect on network operation.

Received at NIC September 10,1973

RECEIVED